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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,230	02/09/2004	Masakazu Ushijima	0353-0202P	3162

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EXAMINER
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ALEMU, EPHREM

ART UNIT	PAPER NUMBER
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2821

DATE MAILED: 05/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Interview Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/773,230	USHIJIMA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ephrem Alemu	2821	

All participants (applicant, applicant's representative, PTO personnel):

- (1) Ephrem Alemu. (3) Jason Rhodes.  
 (2) Tuyet Vo. (4) \_\_\_\_\_.

Date of Interview: 5-17-06.

Type: a) ☒ Telephonic b) ☐ Video Conference  
 c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☐ No.  
 If Yes, brief description: \_\_\_\_\_.

Claim(s) discussed: 1-35.

Identification of prior art discussed: Lin et al. (US 6,717,372).

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

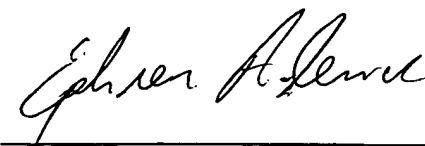
Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Discussed the proposed claim amendment faxed directly to examiner in view of Lin et al. reference. A formal amendment with request for continuation will be submitted and considered.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

  
**TUYET VO**  
**PRIMARY EXAMINER**

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

  
 Examiner's signature, if required

## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

#### Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

#### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

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**Birch, Stewart, Kolasch & Birch, LLP**

# Fax

To:	Examiner Ephrem Alemu	From:	Jason Rhodes (47,305)
Fax:	(571) 273-1818	Date:	April 24, 2006
Phone:		Pages:	16 (including cover sheet)
Your Ref.:	Appl No. 10/773,230	Our Ref.:	0353-0202P
Re:	Proposed amendments to be discussed during telephone interview	CC:	

☐ Urgent    ☒ For Review    ☐ Please Comment    ☐ Please Reply    ☐ Please Recycle

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Comments: Attached is a set of proposed claim amendments for the above-identified application for your review. As we discussed earlier today during our telephone conversation, please give me a call at your earliest convenience so that we can schedule a more formal telephone interview for discussing the case. My telephone number is (703) 208-4011.

For the proposed amendments to claim 1, support is found in the specification at, e.g., page 25, lines 12-18.

For the features in proposed new claim 35, support is found in the specification at, e.g., page 40, line 24 – page 41, line 14.

Thanks

Jason Rhodes

**PROPOSED CLAIM AMENDMENTS**

1. (Currently Amended) An inverter circuit for discharge lamps for multi-lamp lighting, said circuit comprising:

at least two coils connected to a secondary winding of a step-up transformer of the inverter circuit, ~~are arranged, the~~ at least two coils being arranged and magnetically coupled to each other to form a shunt transformer for shunting current such that magnetic fluxes generated ~~thereby by the~~ at least two coils are opposed to each other to cancel out, the at least two coils being configured to ensure a sufficient inductance for the shunting transformer,

discharge lamps connected to said coils, respectively, with currents flowing therethrough being balanced with each other, wherein a large number of discharge lamps are arranged as backlights in a surface light source,

an electric conductor being arranged adjacent to said discharge lamps, wherein parasitic capacitances are generated between said discharge lamps and said adjacent conductor, said parasitic capacitances are being generated in response to said backlights being added to each other as appropriate via said shunt transformer,

the discharge lamps ~~placed in~~ arranged as said backlights comprising an electrode portion and a positive column,

wherein

\_\_\_\_\_ an impedance characteristic of the electrode portion and the positive column of each of said discharge lamps ~~and the positive column~~ has a negative

resistance characteristic, and ~~wherein lighting of each of said discharge lamps is caused by the fact that~~

the inductance of the shunting transformer is sufficient to cause a reactance of an the inductance related to balancing operation of said shunt transformer to exceed the negative resistance of each of said discharge lamps during the current balancing operation, thereby causing each of said discharge lamps to be lit, said reactance being in an operating frequency of the inverter circuit, ~~exceeds a negative resistance of each of said discharge lamps.~~

2. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 1, wherein when one of said discharge lamps connected to said shunt transformer is not lighted, a core of said shunt transformer is saturated by a current flowing through a lighted said discharge lamps, whereby a voltage having a high peak value is generated at a terminal of said unlighted discharge lamp of said shunt transformer, thereby applying a high voltage to said unlighted discharge lamp to light said unlighted discharge lamp.

3. (Canceled)

4. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 1, wherein

a shunt circuit is formed by connecting arranging a plurality of shunt transformers such that said shunt transformers are connected to each other in the

form of a tournament tree, whereby shunt transformers are sequentially connected to each other to form a multi-tier structure, more specifically, by winding  
two windings of coils of each shunt transformer in the multi-tier structure  
are wound such that magnetic fluxes generated by said respective windings are  
opposed to each other, and connecting  
for each tier in the multi-tier structure, one ends-end of each of said two  
windings are connected to each other, with each of said the other ends of said two  
windings other than said one ends connected to each other being connected to one  
the connected ends of two windings of another a shunt transformer in a  
subsequent tier, except for the last tier in the multi-tier structure in which the  
other ends of said two windings are connected to respective discharge lamps. said  
one ends being connected to each other, whereby shunt transformers are  
sequentially connected to each other to form a multi-tier or pyramid-like structure.

5. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 1, wherein

a shunt circuit is formed by arranging a plurality of shunt transformers  
according to a plurality of stages, such that a connecting relationship is formed in  
a turnaround fashion between coils of the plurality of shunt transformers, each  
stage being said shunt circuit is formed by connecting one coil of a corresponding  
shunt transformer to a respective one of said discharge lamps, and connecting the  
other coil of the corresponding shunt transformer to a coil of a shunt transformer  
in that corresponds to a next stage, connecting said other coil of said shunt

~~transformer in said next stage, to one coil of a shunt coil in a further next stage, and providing a required number of similar connections such that a connecting relationship is formed in a turnaround fashion between all coils of shunt transformers;~~

\_\_\_\_\_ and wherein said shunt transformers of said shunt circuit have a sufficient leakage inductance, thereby accommodating errors in an effective transformation ratio of each of said shunt transformers to thereby cause said lamp currents of said plurality of discharge lamps to be simultaneously balanced with each other.

6. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 1, ~~including wherein~~ said shunt transformer is configured to have three or more coils arranged such that magnetic fluxes generated by said respective coils are opposed to each other to cancel out, whereby respective lamp currents of discharge lamps connected to said coils are simultaneously balanced with each other.

7. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to any one of claims 4 and 6, wherein \_\_\_\_\_ a shunt circuit is formed by arranging a plurality of shunt transformers according to a plurality of stages, such that a connecting relationship is formed in a turnaround fashion between coils of the plurality of shunt transformers, each stage being said shunt circuit is formed by connecting one coil of a corresponding shunt transformer to a respective one of said discharge lamps, and connecting the



other coil of the corresponding shunt transformer to a coil of a shunt transformer in a that corresponds to a next stage, connecting said other coil of said shunt transformer in said next stage, to one coil of a shunt coil in a further next stage, and providing a required number of similar connections such that a connecting relationship is formed in a turnaround fashion between all coils of shunt transformers,

\_\_\_\_\_ and wherein said shunt transformers of said shunt circuit have a sufficient leakage inductance, thereby accommodating errors in an effective transformation ratio of each of said shunt transformers to thereby cause said lamp currents of said plurality of discharge lamps to be simultaneously balanced with each other.

8. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 1, wherein when said

a shunt circuit is formed by arranging a plurality of shunt transformers such that shunt coils of the plurality of shunt transformers are connected to form a multi-tier structure, shunt coils associated with at least one tier in the multi-tier structure being operably connected to the discharge lamps

\_\_\_\_\_ and a reactance value of an upper shunt coil is sequentially reduced in comparison with that of a lower shunt coil, whereby a number of turns of shunt coils is progressively reduced.

9. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 1, wherein said step-up transformer is replaced by a piezoelectric transformer.

10. (Canceled)

11. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 1, including diodes each having one end thereof connected to a junction point connecting each winding of said shunt transformer and an associated one of said discharge lamps, the other ends of said diodes being connected into one, ~~forms to form~~ a detection circuit for detecting a voltage generated when any one of said discharge lamps becomes abnormal.

12. (Canceled)

13. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 1, wherein said two coils of ~~each said~~ shunt transformer have obliquely-wound windings.

14. (Canceled)

15. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 2, wherein a shunt circuit is formed by ~~connecting~~

arranging a plurality of shunt transformers such that said shunt transformers are connected to each other in the form of a tournament tree, more specifically, by winding two windings of coils of each shunt transformer such that magnetic fluxes generated by said respective windings are opposed to each other, and connecting one ends of said windings to each other, with each of said other ends of said two windings other than said one ends connected to each other being connected to one ends of two windings of another shunt transformer, said one ends being connected to each other, whereby shunt transformers are sequentially connected to each other to form a multi-tier or pyramid-like structure.

16. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 2, wherein

\_\_\_\_\_ a shunt circuit is formed by arranging a plurality of shunt transformers according to a plurality of stages, such that a connecting relationship is formed in a turnaround fashion between coils of the plurality of shunt transformers, each stage being said shunt circuit is formed by connecting one coil of a corresponding shunt transformer to a respective one of said discharge lamps, and connecting the other coil of the corresponding shunt transformer to a coil of a shunt transformer in that corresponds to a next stage, connecting said other coil of said shunt transformer in said next stage, to one coil of a shunt coil in a further next stage, and providing a required number of similar connections such that a connecting relationship is formed in a turnaround fashion between all coils of shunt transformers,

\_\_\_\_\_ and ~~wherein~~ said shunt transformers of said shunt circuit have a sufficient leakage inductance, thereby accommodating errors in an effective transformation ratio of each of said shunt transformers to thereby cause said lamp currents of said plurality of discharge lamps to be simultaneously balanced with each other.

17. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 2, including said shunt transformer configured to have three or more coils arranged such that magnetic fluxes generated by said respective coils are opposed to each other to cancel out, whereby respective lamp currents of discharge lamps connected to said coils are simultaneously balanced with each other.

18. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 2, wherein when said a shunt circuit is formed by arranging a plurality of shunt transformers such that shunt coils of the plurality of shunt transformers are connected to form a multi-tier structure, a reactance value of an upper shunt coil is sequentially reduced in comparison with that of a lower shunt coil, whereby a number of turns of shunt coils is progressively reduced.

19. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 4, wherein when said shunt coils are connected to form a multi-tier structure, a reactance value of an upper shunt coil is

sequentially reduced in comparison with that of a lower shunt coil, whereby a number of turns of shunt coils is progressively reduced.

20. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 5, wherein when said shunt coils are connected to form a multi-tier structure, a reactance value of an upper shunt coil is sequentially reduced in comparison with that of a lower shunt coil, whereby a number of turns of shunt coils is progressively reduced.

21. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 6, wherein ~~when said a shunt circuit is formed by~~ arranging a plurality of shunt transformers such that shunt coils of the plurality of shunt transformers are connected to form a multi-tier structure, and a reactance value of an upper shunt coil is sequentially reduced in comparison with that of a lower shunt coil, whereby a number of turns of shunt coils is progressively reduced.

22. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 7, wherein when said shunt coils are connected to form a multi-tier structure, a reactance value of an upper shunt coil is sequentially reduced in comparison with that of a lower shunt coil, whereby a number of turns of shunt coils is progressively reduced.

23. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 2, including diodes each having one end thereof connected to a junction point connecting each winding of said shunt transformer and an associated one of said discharge lamps, the other ends of said diodes being connected into one, ~~forms to form~~ a detection circuit for detecting a voltage generated when any one of said discharge lamps becomes abnormal.

24. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 4, including a detection circuit comprised of diodes,  
the detection circuit being configured to detect a voltage generated when any one  
of said discharge lamps becomes abnormal, wherein  
one end of each having one end thereof diode in the detection circuit is  
connected to a junction point connecting each at which a respective winding of  
said shunt transformer and is connected to an associated one of said discharge  
lamps, and  
the other end ends of said diodes being each diode in the detection circuit  
is connected to a junction point at which the windings of said shunt transformer  
are connected together. into one, forms a detection circuit for detecting a voltage  
generated when any one of said discharge lamps becomes abnormal.

25. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 5, including a detection circuit comprised of diodes,

the detection circuit being configured to detect a voltage generated when any one of said discharge lamps become abnormal, wherein

one end of each having one end thereof diode in the detection circuit is  
connected to a junction point connecting each at which a respective winding of  
said shunt transformer and an associated one of said discharge lamps, and  
the other end ends of said diodes being diode in the detection circuit is  
connected to a junction point at which the windings of the shunt transformer are  
connected. into one, forms a detection circuit for detecting a voltage generated  
when any one of said discharge lamps becomes abnormal.

26. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 6, including a detection circuit comprised of diodes,  
the detection circuit being configured to detect a voltage generated when any one of said discharge lamps becomes abnormal, wherein

one end of each having one end thereof diode in the detection circuit is  
connected to a junction point connecting each at which a respective winding of  
said shunt transformer and is connected to an associated one of said discharge lamps, and  
the other end ends of said diodes being each diode in the detection circuit  
is connected to a junction point at which the windings of said shunt transformer  
are connected together. into one, forms a detection circuit for detecting a voltage  
generated when any one of said discharge lamps becomes abnormal.

27. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 7, including a detection circuit comprised of diodes, the detection circuit being configured to detect a voltage generated when any one of said discharge lamps becomes abnormal, wherein

one end of each having one end thereof diode in the detection circuit is connected to a junction point connecting each at which a respective winding of said shunt transformer and is connected to an associated one of said discharge lamps, and

the other end ends of said diodes being diode is connected to a junction point at which the windings of said shunt transformer are connected together, into one, forms a detection circuit for detecting a voltage generated when any one of said discharge lamps becomes abnormal.

28. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 8, including a detection circuit comprised of diodes, the detection circuit being configured to detect a voltage generated when any one of said discharge lamps becomes abnormal, wherein

one end of each having one end thereof diode in the detection circuit is connected to a junction point connecting each at which a respective winding of said shunt transformer and is connected to an associated one of said discharge lamps, and

the other end ends of said diodes being each diode in the detection circuit is connected to a junction point at which the windings of said shunt transformer



~~are connected together. into one, forms a detection circuit for detecting a voltage generated when any one of said discharge lamps becomes abnormal.~~

29. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 2, wherein said two coils of each said shunt transformer have obliquely-wound windings.

30. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 4, wherein said two coils of each shunt transformer have obliquely-wound windings.

31. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 5, wherein said two coils of each shunt transformer have obliquely-wound windings.

32. (Currently Amended) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 6, wherein ~~said two coils~~ each coil of each said shunt transformer ~~have~~ has obliquely-wound windings.

33. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 7, wherein said two coils of each shunt transformer have obliquely-wound windings.

34. (Previously Presented) The inverter circuit for discharge lamps for multi-lamp lighting according to claim 8, wherein said two coils of each shunt transformer have obliquely-wound windings.

35. (New) A surface light source system comprising:

a shunt circuit module including:

two coils connected to a secondary winding of a step-up transformer of the inverter circuit, the two coils being magnetically coupled to each other to form a shunt transformer for shunting current such that magnetic fluxes generated thereby are opposed to each other to cancel out; and

an inverter circuit module including:

discharge lamps connected to said coils, respectively, with currents flowing therethrough being balanced with each other, wherein a large number of discharge lamps are arranged as backlights in a surface light source,

an electric conductor being arranged adjacent to said discharge lamps, wherein parasitic capacitances are generated between said discharge lamps and said adjacent conductor, said parasitic capacitances being generated in response to said backlights being added to each other as appropriate via said shunt transformer,

wherein:

the discharge lamps placed in said backlights comprising an electrode portion and a positive column,

an impedance characteristic of the electrode portion of each of said discharge lamps and the positive column has a negative resistance characteristic, and wherein lighting of each of said discharge lamps is caused by the fact that a reactance of an inductance related to balancing operation of said shunt transformer, said reactance being in an operating frequency of the inverter circuit, exceeds a negative resistance of each of said discharge lamps and a self-resonance frequency of the shunt transformer is higher than the operating frequency of the inverter circuit module, and

said shunt circuit module is formed independent of the inverter circuit module, said shunt circuit module being placed on a side or two sides of said surface light source in a manner matching shunting conditions of said discharge lamps.